

09/716,016

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of: Mayer et al.

Attorney Docket No.:
NOVLP081D1/NVLS-000261

Patent: 6,946,065 B1

Issued: September 20, 2005

Title: PROCESS FOR ELECTROPLATING
METALS INTO MICROSCOPIC RECESSED
FEATURES

CERTIFICATE OF MAILING

I hereby certify that this correspondence is being deposited with the U.S. Postal Service with sufficient postage as first class mail on November 30, 2005 in an envelope addressed to the Commissioner for Patents, P.O. Box 1450 Alexandria, VA 22313-1450.

Signed: _____

Aurelia M. Sanchez

**REQUEST FOR CERTIFICATE OF CORRECTION
OF OFFICE MISTAKE
(35 U.S.C. §254, 37 CFR §1.322)**

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450
Attn: Certificate of Correction

Dear Sir:

**Certificate
DEC 07 2005
of Correction**

Attached is Form PTO-1050 (Certificate of Correction) at least one copy of which is suitable for printing. The errors together with the exact page and line number where the errors are shown correctly in the application file are as follows:

TITLE PAGE:

1. On the front page of the patent, please change the title from "PROCESS FOR ELECTROPLATING METAL INTO MICROSCOPIC RECESSED FEATURES" to --PROCESS FOR ELECTROPLATING METALS INTO MICROSCOPIC RECESSED FEATURES--. This appears correctly in the patent application as filed on November 16, 2000, on page 1, line 1.

DEC 07 2005

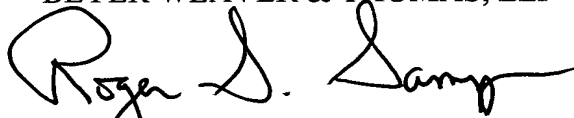
CLAIMS:

1. In line 4 of claim 1 (column 21, line 58) change "in pall" to --in part--. This appears correctly in Amendment B as filed on March 29, 2004, on page 2, paragraph 2, line 3.

Patentee hereby requests expedited issuance of the Certificate of Correction because the error lies with the Office and because the error is clearly disclosed in the records of the Office. As required for expedited issuance, enclosed is documentation that unequivocally supports the patentee's assertion without needing reference to the patent file wrapper.

It is noted that the above-identified errors were printing errors that apparently occurred during the printing process. Accordingly, it is believed that no fees are due in connection with the filing of this Request for Certificate of Correction. However, if it is determined that any fees are due, the Commissioner is hereby authorized to charge such fees to Deposit Account 500388 (Order No. NOVLP081D1).

Respectfully submitted,
BEYER WEAVER & THOMAS, LLP

A handwritten signature in black ink, appearing to read "Roger S. Sampson". The signature is fluid and cursive, with the first name "Roger" and last name "Sampson" clearly distinguishable.

Roger S. Sampson
Registration No. 44,314

P.O. Box 70250
Oakland, CA 94612-0250
650-961-8300

DEC 07 2005



PROCESS FOR ELECTROPLATING METALS INTO MICROSCOPIC RECESSED FEATURES

Steven T. Mayer

Vijay Bhaskaran

Evan E. Patton

Robert L. Jackson

Jonathan Reid

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10 REFERENCE TO RELATED APPLICATIONS

This application claims priority from United States Provisional Patent Application 60/105,699, filed October 26, 1998, which is incorporated herein by reference.

15 BACKGROUND OF THE INVENTION

Technical Field

This invention relates to electroplating and, in particular, to electrochemical deposition of metals, most particularly to the electrochemical deposition of copper into microscopic recessed features such as high aspect ratio trenches and vias as
20 may occur in the fabrication and packaging of integrated circuits.

Description of Related Art

The art of integrated circuits is moving irresistibly towards increased density of components and faster operating speeds. One problem encountered in
25 decreasing the size of components fabricated on an integrated circuit relates to the conductivity of metallic interconnections. Conventional integrated circuits use aluminum as a conductor but for future generations of submicron components, the conductivity of aluminum is not sufficiently high to give desired performance. Smaller dimensions for conductive interconnections lead to higher resistance and

This listing of claims will replace all prior versions and listings of claims in the application:

Listing of Claims:

19.-22. (Canceled)

23. (Currently Amended) A method of mitigating corrosion of a metal seed layer on the surface of recessed features caused by contact of said metal seed layer with an electroplating solution, the metal seed layer being formed at least in part from copper, said method comprising cathodically polarizing said metal seed layer with respect to said solution prior to or less than approximately 5 seconds following contact of said metal seed layer with said solution. ~~A method of mitigating corrosion as in Claim 19~~ wherein said cathodic polarization of said metal seed layer is performed by applying a net cathodic voltage to said metal seed layer with respect to a copper reference electrode in the electroplating solution prior to said metal seed layer contacting said electroplating solution.

24. (Original) A method of mitigating corrosion as in Claim 23 wherein said voltage is approximately -10 millivolts with respect to said reference copper electrode in said electroplating solution.

25. (Previously Presented) A method of electroplating a metal onto a surface comprising a field region and a plurality of recessed features having relatively higher and lower aspect ratios, the surface having a metal seed layer, the method comprising:

contacting said surface with an electroplating solution comprising metal ions and an additive under conditions wherein the metal seed layer is cathodically polarize with respect to the electroplating solution prior to or less than approximately 5 seconds following said contacting;

applying a dc cathodic current through said surface, the dc cathodic current having a first current density that is sufficiently small that depletion of metal ions and the additive is absent at both the field region and the recessed features, to create a substantially conformal thin conductive metal film on said surface;

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(Also Form PT-1050)

UNITED STATES PATENT AND TRADEMARK OFFICE CERTIFICATE OF CORRECTION

PATENT NO. : 6,946,065 B1

DATED : September 20, 2005

INVENTOR(S) : Mayer et al.

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

In the Title Page:

On the front page of the patent, please change the title from "PROCESS FOR ELECTROPLATING METAL INTO MICROSCOPIC RECESSED FEATURES" to --PROCESS FOR ELECTROPLATING METALS INTO MICROSCOPIC RECESSED FEATURES--.

In the Claims:

In line 4 of claim 1 (column 21, line 58) change "in pall" to --in part--.

MAILING ADDRESS OF SENDER:

PATENT NO. 6,946,065 B1

Roger S. Sampson
BEYER WEAVER & THOMAS, LLP
P.O. Box 70250
Oakland, CA 94612-0250

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